

WORKSPACES FOR FOCUSED ENTERPRISE COMMUNITIES

I.T. HAWRYSZKIEWYCZ
Faculty of Information Technology
University of Technology, Sydney
PO Box 123, Broadway, NSW 2007, Australia
(e-mail: igorh@socs.uts.edu.au)

Abstract

Many business enterprises are characterized by their dynamic nature and transient work arrangements. This in turn requires computer support that goes beyond workflow systems. Instead it is necessary to provide support for process emergence and collaborative work with continually varying team members. Focused organization collaborative work is increasing with work becoming more knowledge intensive. Support for putting together team structures that facilitate knowledge sharing, allocate responsibilities, and set up support services are needed. Such support systems require semantics for team construction and a ubiquitous approach to implementing structures within practice. The paper describes semantics for team construction and feasibility of meeting them by illustrating a prototype system that meets such requirements.

Keywords:

Collaborative Systems and Applications,
InterNet tools, Knowledge Management, Workspaces

INTRODUCTION

The emphasis on knowledge sharing and creation in organizations is placing new requirements on ways to support knowledge sharing in business systems. This has two important consequences. One is that it is necessary to go beyond simply designing systems that support predefined processes. It is also necessary to provide the flexibility needed for the emergent processes found in knowledge creation. The second and related property is that processes must be more community based and place emphasis on sharing tacit knowledge. Such processes should encourage exchange of experiences and collaboration in interpreting, and where possible codifying, these experiences. In fact it is now increasingly recognized that any process must include a knowledge sharing component to assist it to continually improve rather than going through regular re-engineering processes. The knowledge intensive processes are team

based and emergent. They must bring together users with specialized knowledge [2], both explicit and tacit, and to combine such knowledge to create new knowledge forms. They must enable individuals to participate in many teams and to easily move between the teams. This in turn requires flexible governance structures [5] and awareness mechanisms to ensure that distributed workspace activities converge to a common aim. Generically, processes followed by such teams are emergent and can be characterized as innovation [6] processes, or processes that support personalized and varying client needs.

Workspace systems have been suggested as the technology for knowledge sharing. Their goal is to bring people and explicit knowledge into the same electronic space for them to share comments about ideas and to bring their specialist insights into the workspace. Usage of such technologies presupposes social acceptance and the necessary communication skills to make such electronic workspaces productive. Salmon [10] and O'Hara-Deveraux [9] suggest stages that teams go through in adopting such technologies. Salmon discusses the stages of adopting technologies in learning environments whereas O'Hara-Deveraux discusses evolution in the context of global teams. Such evolution requires technologies where workspaces must be adaptive to permit user driven changes as collaboration evolves. At the same time workspaces must present intuitive to encourage extensive use

This paper examines the kind of workspaces needed and their evolution in practice. Such evolution commences with community based spaces through task based interfaces to knowledge sharing. It describes a system called LiveNet, which is being used for this purpose [3]. The goal is to provide a flexible system that can evolve dynamically as the nature of collaboration changes. It can begin with communities but enable these to spin-off task oriented teams and provide them with tools to effectively share and develop knowledge. The paper will describe the semantics supported by this system and some experiences in its use.

CHARACTERISTICS OF THE DOMAIN

Knowledge sharing calls for closely linked communities that can work together towards common goals. Each community can be supported by a workspace that allows its members to interact and carry out their work. A general view of workspace structures within a business framework for a knowledge-based enterprise is shown in Figure 1. Here there are the common processes supported using an ERM system. These are presented generally through an enterprise workspace, usually the IntraNet home page. Additional workspaces are then established to support particular areas and projects within the enterprise. People can set up their own private spaces that link to the organizational project spaces. They can also set up joint workspaces for their groups. Examples may include sales teams, design teams or communities that exchange other kinds of knowledge. In education the project spaces are subjects. The personal spaces are student spaces customized to the subjects that they take.

The design objective then becomes to identify the organizational workspace structures for the kind of networked organization shown in Figure 2 – that is to fit into the organizations culture.

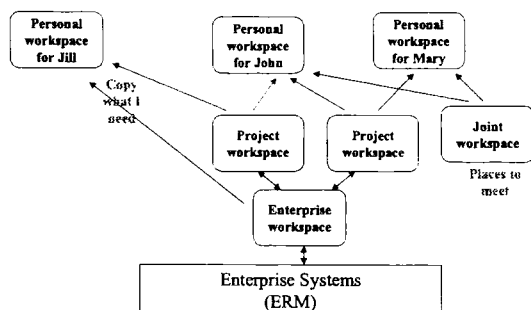


Figure 1 – Generic Places

Workspace Structures

The paper now describes a view of this domain from three perspectives. These are the structure, coordination and behaviour perspectives. The structure generally is seen as a number of related activities each proceeding to a common goal. As an example the innovation process can be organized into the workspace structure shown in Figure 2. Figure 2 shows three main activities. Market analysis identifies a need and produces a market report. This is used to generate a proposal, which then goes to product planning.

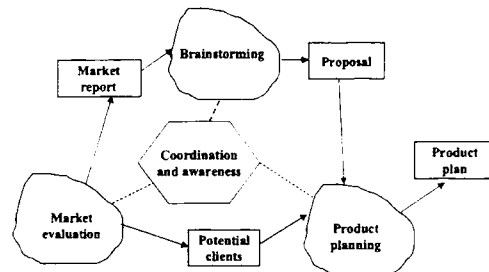


Figure 2 – A set of connected places

Each activity includes a set of roles, which are responsible for taking actions within the activity and can view or change documents. The activities are all going on at the same time and ways to coordinate and maintain continuous awareness between them are needed. In addition information is shared between the activities and messages can be passed between them.

Another characteristic is the opportunistic nature of such knowledge intensive activities [1]. The activities evolve dynamically and sometimes rapidly change as new situations arise. Evolution can include changes in participants, goals, and methods of interaction as people begin to understand the collaborative tools and learn how to collaborate electronically. The evolution must be user driven and any collaborative tools should allow the users themselves to initiate such change and modify their processes. Thus it should be possible at any time for an activity participant to initiate some new actions and define events and milestones which may need follow-up actions.

The general first step in most collaborative processes is to set up workspaces for different teams. The way to do this is illustrated informally in Figure 3. Here a manager may set up any number of groups, in this case the marketing and production planning groups. The manager will set the goals for these groups and provide them with initial information. This will be made available through the workspaces set up for the groups. The way workspaces are set up is also illustrated informally in Figure 3. The steps involved are:

A number of people get together to address a long term issue,
These people make arrangements to meet and work together,
They bring in the information, tools to work in this area,

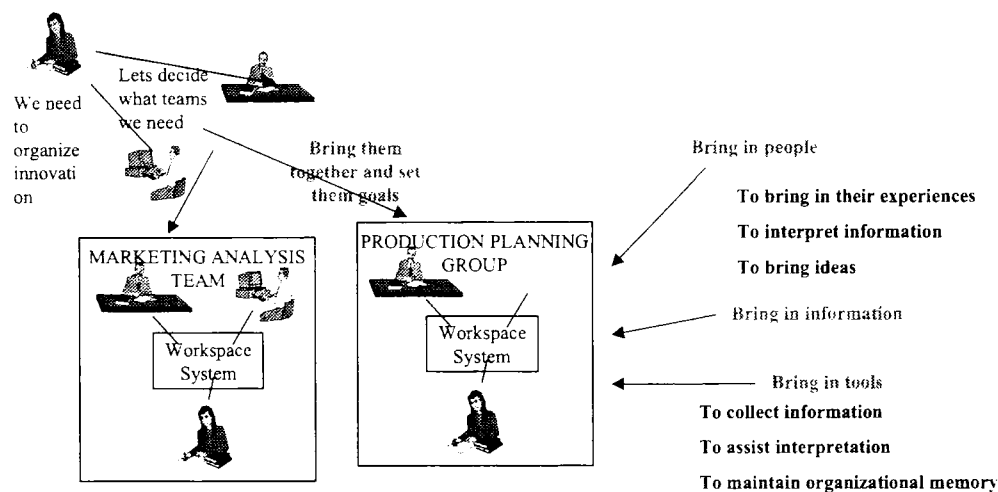


Figure 3 - Organizing the teams.

Defining the Semantics

Figure 3 illustrates the broad idea of the growth of knowledge sharing communities. It may start with a community that brings together task based teams and then improve ways that these teams can use to share knowledge. The paper agrees with experiences that knowledge sharing using technology will not just happen. There are a number of organizational requirements to be met to facilitate introduction of collaborative systems into enterprises. These include:

- Defining role structures that identify responsibilities of people within a knowledge intensive process. These include special roles to facilitate capturing of knowledge, evaluating its quality, and ways to capture analyze tacit knowledge.
- Setting up processes to facilitate a knowledge sharing environment.
- Providing tools to both store knowledge and also to assist users to analyze it.
- Providing status support through awareness and common understanding of goals, so that team members are kept aware of the goal of their work.

GROUPS SEMANTICS

We have developed a support system, LiveNet [7], for such environments. The underlying goal of LiveNet is to support easy formation of groups and their evolution from loose communities to strongly focused knowledge creation groups. It is also to focus these groups on information relevant to their task and provide them with the ability to collaborate. It thus differs from other workspace systems in

its ability to dynamically and in a user driven way to restructure groups and at the same time reclassify information to allow new groups to easily focus on new tasks.

The groups carry out their work in workspaces. Two such workspaces were defined in Figure 4, one to brainstorm and another for production planning. Figure 4 also shows the assignment of people to the different workspaces. Thus Thomas, Lim, Benny, Amy and Chloe, are assigned to brainstorming. Members Benny, Chloe, Gerard and Mary are assigned to production planning. It should also be noted that members can be assigned to more than one workspace, as for example Benny, Amy and Chloe. Users can be added and deleted from workspaces as the need arises. Group members must be explicitly assigned to a workspace. In that case they become **participants** of the workspace. Thus Thomas is a group member, who is a participant of the Brainstorming workspace. Amy participates in two workspaces.

A workgroup is thus a collection of workspaces and group members. A workspace is part of one workgroup only, whereas a user may be a group member in more than one workgroup. A group member can only be assigned to a workspace if that workspace is in the same workgroup. A group member can be assigned to any workspaces in their workgroup. That workgroup member becomes a **participant** of that workspace.

Our initial goal was to simplify ways to set up such workspaces. Each workspace is defined by its owner. The owner defines the relationships within the workspace task and supports its actions. The semantics are as follows:

- The workspace has one owner, who can create workspace roles and define their governance structures. Roles are empowered in a range of ways,

including ability to change workspace structures, the actions in the workspaces, and access to documents.

- Any number of documents organized to provide different views for different roles. These are accessed through folders, which are in fact collections of references to document repositories. Views are made up of different sets of references.
- Discussions or other ways can be set up for people within workspaces to interact.
- Awareness features are provided to keep users within and across workspaces aware of on-going activities,
- Ways to communicate through messages and notification schemes between workspaces, setting up awareness features.

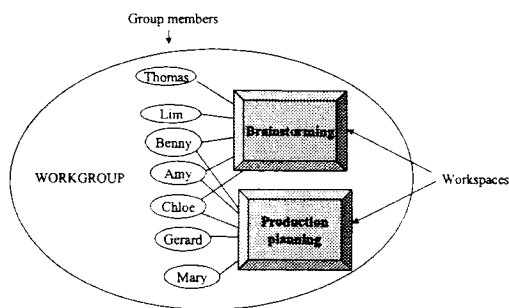


Figure 4– Organizing Work within Workgroups

Community growth

Our goal is to provide ways for workspaces to evolve as usage changes. Generically evolution has been identified in a number of ways. Salmon [10] describes evolution in learning proceeding through five stages. Stage 1 is access and exposure to technology. This is followed by on-line socialization where community users familiarize themselves with the workspace using informal exchanges. The next step is information exchange where explicit information is exchanged. Then there is knowledge construction where documents are developed through insights gathered by workspace participants. Then finally users begin to develop their own workspace. O'Hara-Deveraux and Johansen [9] also describe evolution of team building in the context of distributed teams. They see team building going through orientation, trust building, goal clarification, commitment, implementation and performance. We have generalized these ideas into three kinds of workspaces, namely:

- Initially community workspaces are set up, which support the entire community by providing information about the community context as a whole and support exchange of information and informal socialization,
- Task based workspaces are then set up to achieve well-defined goals, and

- Such task based workspaces become more knowledge intensive.

Community workspace

Figure 5 illustrates the kind of community workspace to support a subject in teaching. There are a number of folders each with subject material for a particular teaching goal. Thus there is a folder for overheads, another one for tutors and one for administration. Each folder has its own associated discussion. The notion of folders as collections of references allows documents to be grouped in different ways for each task. Thus a grouping for tutors may be directed towards their activities, whereas that of students may present a different view for students.

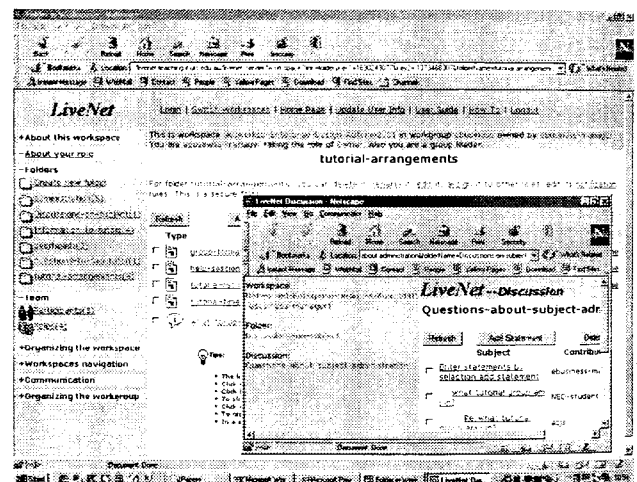


Figure 5 – A Community Place for Teaching

Our next requirement is to support community evolution. Communities in LiveNet need not be predefined to allow such evolution. Their membership need not be fixed for all time. They can grow and evolve as work evolves. Thus work structures are completely dynamic. The community members themselves can make these changes by adding or deleting members from the group.

Creating Task Project Groups

One useful semantic that we found in supporting evolution is to create the notion of workgroups, which is different from that of workspaces. We have found this distinction necessary to manage scalability and to create focused independent groups. Workgroups provide the means to define organizational units, whereas workspaces provide the means to organize the work of people in these units. A workgroup can group people by project, organizational unit or a meeting. Each workgroup can carry out their work in workspaces defined for this workgroup. LiveNet supports such evolution. The principal semantics here are:

- Create a new group and designate leaders. A workgroup has at least one leader and a master workspace. A workgroup leader can add new users to the workgroup. The leader can also create new workgroups and move people to these workgroups. These can be users from other existing workgroups or new system users.
- Create new workspaces within workgroups and designate its owner.
- Set up any workflows within and between workspaces. Workflows result in messages exchanged between roles in the workspaces.
- Provide ways for new groups to easily form.

It is then possible to identify a group within a community and set up task oriented workspaces for them to carry out their work.

Task based Workspace

Workgroups are usually supported with task based interfaces. An example of a LiveNet task based interface is shown in Figure 6. Here there are usually documents and discussions. It is possible for users to create folders for particular documents add discussions to these folders for people to comment on them and support versioning to keep track of changes.

The interesting aspect are ways to extend or utilize workspaces to facilitate knowledge sharing.

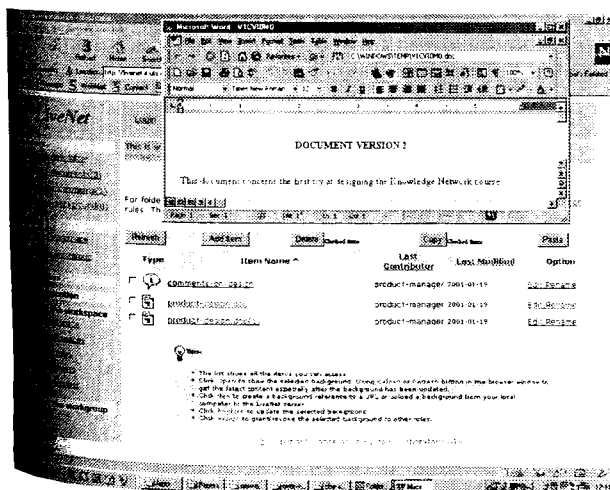


Figure 6– Task Based Workspace

Extending to Knowledge Sharing

Work in knowledge intensive groups often departs from well defined tasks, such as setting up a spreadsheet, to more knowledge oriented work requiring people to quickly make sense of situations in related domains, and interpret them in their own context. There is the need to analyze increasingly specialized knowledge and to bring

together explicitly stored knowledge and tacit knowledge possessed by individuals [8]. Team members from different backgrounds must be able to quickly arrive at common terminologies so that they for example describe the need to form perspectives within different frames of reference.

Our research here centers on ways of organizing workspaces to support the kinds of process suggested in [8] and described earlier. The solution includes a combination of roles, workspace objects and tools. Our solution is to use folders within the workspace can be focused on a particular knowledge goal. For example, Figure 7 has a folder to create a marketing strategy. The folder contains the elements that give access to previous knowledge in the form of experiences and actions to interpret them. Further interpretations based on tacit knowledge can be captured in discussion with invited experts.

Our work then centers on defining workspace templates for knowledge sharing and providing intelligent support to construct such workspaces – that is developing a knowledge map. Given the goal, the agent uses the knowledge map to set up the workspace by including all the needed components.

Provision of generic modules for process management by combining checklists with milestones to expedite review processes across distance.

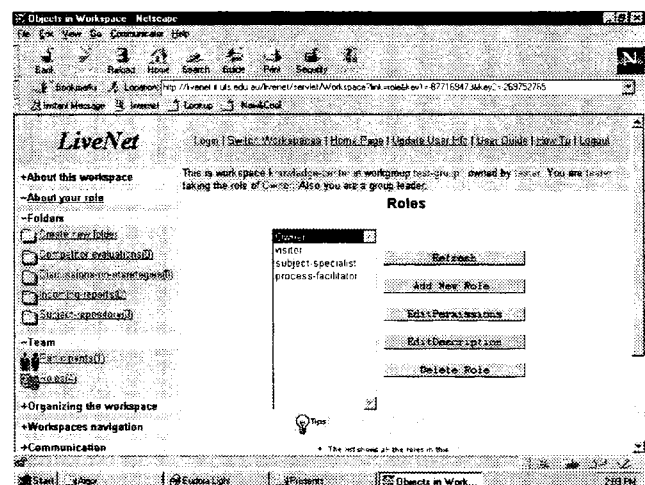


Figure 7 – A folder organization for knowledge sharing

SOME EXPERIENCES

The two major issues are workspace organization and presentation, followed closely by strategies for introducing such technologies into practice. We have found particularly through our experiences in using LiveNet in teaching that a gradual approach is the most fruitful. Indeed progress through community interfaces for introduction and socialization is a good step to familiarize users with the technology. The next step is formation of

student groups through task interfaces, which eventually become knowledge centered as project work proceeds.

LiveNet is a generalized system and users must express their actions in terms of general commands. Using generalized semantics places the additional burden of users having to map their intuitive perception of their work onto workgroup semantics. Thus intuitively we have a student group, or a meeting. In either case we identify the workgroup involved as the group or the meeting. Its implementation using generalized semantics requires the user to first of all see their problem in terms of the generalized semantics and express it at the interface in terms of these semantics. Thus although the system is generalized in the functional sense and can be easily customized to a particular application, the customization still requires users to think in ways to map their problem semantics to generalized semantics when using the system, thus placing barriers in its use. Thus instead of selecting a button called meeting, they have to select a workspace. To invite a person they have to first define a role and then invite a person to that role.

Our current work is to find ways to provide technologies that can customize both the functionality and the interface terms. In that case it will be possible to quickly define interfaces that match the users intuitive perception to the problem. Currently to do this requires the development of a Java servlet that can take considerable time. Our work is to provide a way to define the interface terms in terms of the general semantics using a definition language.

SUMMARY

The paper first described requirements of workspaces within collaborative environments. It then outlined a set of requirements that must be met by computer support systems that support such requirements.

This paper proposed that one way to support such environments is to use workgroups with shared workspaces that can dynamically evolve. Flexibility is achieved through the ability to create a new workspace,

invite people into it, and provide them with the support needed to carry out their work in a collaborative manner. The paper defined the semantics for such groups and an implementation. It then suggested that generalized semantics often place cognitive barriers in their use and suggested that technologies provide ways to customize interfaces that map users cognitive perceptions to generalized semantics.

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